PUBLIC SERVICE COMMUNICATIONS

A Manual for Your Emergency and Traffic Operations

Public service communication has been a traditional responsibility of the Amateur Service since 1913, when the first known emergency communication was conducted by an amateur. In today's amateur radio, it is a highly organized and very worthwhile part of day-to-day operation. Internally, it is implemented principally through the Amateur Radio Public Service Corps, sponsored by ARRL. ARPSC comprises the Amateur Radio Emergency Corps (AREC), and the National Traffic System (NTS). The Radio Amateur Civil Emergency Service (RACES) and other amateur public service groups are also a part of ARRL-recognized amateur radio public service effort.

The AREC now consists of approximately 30,000 licensed amateurs who have registered their availability for emergency operation in the public interest. Its operational leadership consists of community, county and section emergency coordinators appointed by elected administrative officials at ARRL section level called Section Communications Managers. There are approximately 1300 emergency coordinators (ECs) and 74 section emergency coordinators (SECs).

NTS is a daily-operating organization for handling medium and long distance traffic. It is, in effect, the "long lines" department of ARPSC. It consists of nets at four levels with lines of liaison connecting them for systematic flow of message traffic from point of origin to point of delivery in the shortest possible time consistent with organizational training objectives. Its leaders are appointed either by the SCM or by the ARRL Communications Manager, depending on the level at which appointed.

A separate sub-part of the amateur regulations (Part 97, sub-part F) provides for the Radio Amateur Civil Emergency Service (RACES). This is a special phase of amateur operation sponsored by the Office of Civil Defense, Department of the Army, and applies to U.S. amateurs only. Its primary purpose is to provide amateurs with special opportunity to serve civil defense.

All three of these organizations are discussed in detail in this manual which, along with "Operating an Amateur Radio Station," constitutes the "bible" of the Amateur Radio Public Service Corps. The Appendix will provide some additional operational details not covered in the rest of the booklet.

Published for the

Amateur Radio Public Service Corps

by the American Radio Relay League

HEADQUARTERS, 225 MAIN STREET, NEWINGTON, CONN., U.S.A. 06111

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DISTRESS CALLING

The official ARRL distress call on cw and RTTY is QRRR, on phone "CQ Emergency." The distress call is used for emergency only, and only by a station definitely asking for assistance.

The logical place for a distress call is on an established local net or other calling or emergency frequency. However, a QRRR or "CQ Emergency" should be electrifying no matter when or where heard in the amateur bands.

Any distress call, especially if transmitted "blind," should contain details as to (1) location of the emergency, (2) nature of distress and (3) type of assistance required, in addition to any other information which would be helpful to a listener.

DO NOT USE QRRR or "CQ Emergency" unless emergency assistance is required!

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I – PUBLIC SERVICE

Amateur radio exists because it qualifies as a service. Throughout our history, we amateurs have established a reputation for public service communications which is of the greatest importance to our continued occupation of frequencies. At first this service was rendered spontaneously and on an individual basis. As time progressed, the need for and value of organization became evident, resulting in the establishment of organized trunk lines and net systems and later of the Amateur Radio Emergency Corps and the National Traffic System.

Today there exists in amateur radio a very complete and very tight volunteer organization of amateur operators for public service called The Amateur Radio Public Service Corps. Sponsored by ARRL, this corps includes the combined facilities of the Amateur Radio Emergency Corps, as it has developed since 1935, the National Traffic System as it has developed since 1949, and recognizes the Radio Amateur Civil Emergency Services (RACES) and independently-organized amateur facilities as integral parts of the Amateur Service's public service effort. These initials (ARPSC, AREC, NTS and RACES) and others to be introduced subsequently will occur frequently throughout this booklet.

II – THE AMATEUR RADIO PUBLIC SERVICE CORPS

Point Number 1 in the ARRL program for upgrading the amateur service reads: "Combining the Amateur Radio Emergency Corps and the National Traffic System to constitute an Amateur Radio Public Service Corps for maximum effectiveness in the public interest." Thus, ARPSC is a new name for an old concept, representing as it does the consolidation of two long-established operating groups whose courses have been so obviously convergent that it is surprising ARPSC was not set up long ago. Every emergency net is bound to be, to some extent, a traffic net, and every traffic net should be prepared to take on emergency duties. Emergency-conscious and traffic-conscious operators have this in common: they both derive their chief pleasure out of activities which are directly beneficial not only to amateur radio but also to their community and to their country.

In handling third-party traffic and in preparing for and providing emergency communications, the amateur has *direct* contact with the general public, a characteristic that most other forms of amateur service do not have. For many years, we spoke of these activities as "emergency work" and "traffic handling" without taking note of any particular connection between them. What ARPSC does, in effect, is to put them under a general heading and bring them closer together.

Basic Organization and Functions

The diagram of Fig. 1 will give a general idea of how ARPSC is organized. While a really graphic portrayal is difficult, one can, from the diagram, get some idea of how AREC and NTS tie together at top and bottom to form ARPSC. Most AREC nets exist only at local level, and are tied into NTS at section (usually state) level for integration into the national system. The divisions are again tied together at headquarters by a common centralizing setup in the ARRL Communications Department.

Leadership in the Emergency Division (AREC) is exercised by the section emergency coordinator and by the local EC, as shown; in the Traffic Division (NTS) by net managers at the various levels, by SCM-appointed Route managers (RMs) and phone activities managers (PAMs), and by net managers designated by these officials in some cases.

Usually, emergency operation is initiated at the local level and is the business of the AREC emergency coordinator. Even if the emergency situation transcends local and becomes of statewide, or regional, or even of national concern, the situation and what to do about it are primarily the concern of AREC officials. Communications concerning it would be generated by civic and welfare officials, or at their behest, and resulting problems handed to the AREC for solution.

While ARPSC is the ARRL's sponsored public service organization, it should not be concluded that this is all there is to amateur radio public service or that this is the extent of the League's interest in it. On the contrary, there are many other amateur public service operating groups under different sponsorship which are a vital part of the public service function of the amateur. As such, they merit and receive the League's recognition and assistance.

One of them, the Radio Amateur Civil Emergency Service (RACES), is sponsored by the Office of Civil Defense and implemented at various levels of civil defense. Since it is permanently established as a branch of the amateur service under Part F of the amateur regulations, some of the details of its operation will be included in this publication (part V). Others, sponsored by various other government agencies or organized and operated by amateurs outside the ARRL sphere, are more transitory in nature or not fully amateur-oriented and will be covered in *QST* magazine in accordance with current activities.

The details of the internal workings of each of the divisions of ARPSC will come in for further discussion later in this booklet. Our primary topic

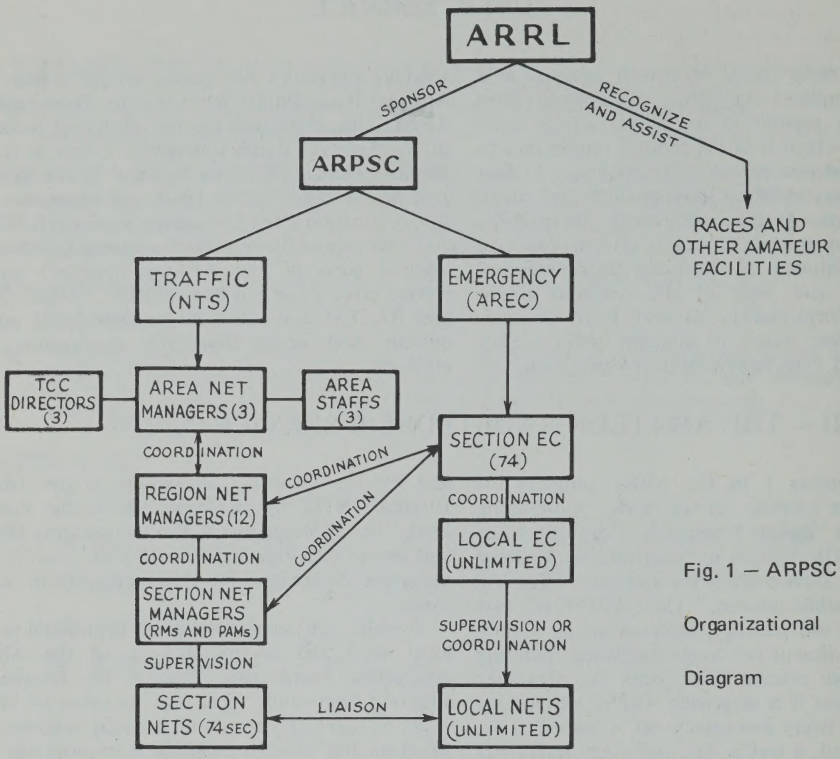

Fig. 1 — ARPSC Organizational Diagram

at the present instance is that part of the setup which couples together AREC and NTS to form ARPSC. This involves closely-planned liaison between them so that both in normal times and during an emergency there can be a singleness of operation and purpose. Thus, the AREC, which previously operated during emergencies, now takes on some regular-operation duties while NTS, which usually operated only routinely, now takes on some emergency-operation duties. The ARPSC concept therefore operates under two different situations – normal, every day operation (NTS) and special emergency operation (AREC).

Normal operation. During its everyday operation, NTS commences in the early evening with a Section net meeting. The cycle then goes from Section to Region to Area, and back down again through Region to Section the same evening, encompassing a period of about four hours. While this is going on, and at other times, the Transcontinental Corps (TCC) busily shuttles traffic among the three Area nets. This sequence occurs *every* day, including week ends and holidays.

There is one other echelon of NTS nets, called Local nets. Such nets include those organized at city, community or county level for the purpose of handling and delivering traffic within such boundaries, even though in many cases such traffic could be delivered by landline without toll charge. This is called "neighborhood delivery" and is a valuable training phase of NTS operation which would be most useful in the event of a local communications emergency.

The establishment of this "local" echelon of NTS brings into the NTS picture hundreds of AREC nets which hold only occasional drills and which are intended to operate mainly during emergencies. If they operate at least once per week *regularly* and maintain liaison with their Section NTS net, any message traffic received through the system for delivery may be routed to the point closest to delivery in the Local net. The very important liaison function will require stations with considerable versatility, because most section nets operate on 80 meters (some on c.w.) while most local nets use the v.h.f.'s.

Local AREC nets are encouraged to take on regular traffic-handling functions by making liaison with NTS, and thus becoming local NTS nets. There is nothing like regular message-handling in normal times to prepare a group for team operation in an emergency situation.

Emergency Operation. We are concerned here only with peacetime disasters, when wire and power lines are down or a situation exists which requires amateurs to be activated for the purpose

of supplying emergency, supplementary or back-up communications. Plans for wartime operation come under the Radio Amateur Civil Emergency Service, which will be discussed in Part V.

For the AREC, the emergency is the culmination of all its preparatory efforts; for NTS, it is an intensive interlude in its daily operations. When an emergency situation arises, the usual procedure is for an official of a served agency (e.g., the Red Cross) to notify a representative of the amateur service (e.g., the emergency coordinator, with whom he should have had previous contact) of specific requirements for emergency communication. The EC then alerts the AREC crew via whatever prearrangements they have made and sets up the required circuits.

Such a system has worked adequately in the past for local communications purposes, but medium and long distance requirements, when needed, have usually been set up spontaneously and have shown the need for advance planning. Under the ARPSC concept, the NTS takes on an emergency-operation complexion for the express purpose of handling medium- and long-distance traffic. This is done by activation of certain NTS nets, as required, at Section, Region or Area level, and of the TCC, depending on the extent of the emergency and the communications needs. Such activation is accomplished primarily on the initiative of the AREC official concerned, who is the man on the scene who perceives the need. In the case of a local-type emergency, the EC has ready access to the NTS Section net, and, if it is needed, he can request its activation on an emergency basis. Via this net he can also request activation of adjacent AREC nets or their participation with his group to extend local coverage if this seems indicated.

On recommendation of an SEC or at the request of a Section net manager, the NTS Region net might also be activated; and when or if inter-Regional traffic exists, an NTS Area net might be activated at the request of a Region net manager.

In the final analysis, which nets are activated, to what extent, on what basis, are matters determined by the various ARPSC officials acting together to set up the system to be used for that particular emergency. In order that this kind of coordination will work with a minimum of confusion and conflict, these amateur officials must keep in touch with and be known to each other in the normal course. Come the need, they will have established pre-arranged methods of contacting each other by radio. Such methods may entail use of established nets, one or more established calling and emergency frequencies or some other mutually-agreed-upon means. Of course landline can be used if available, but should not be depended upon.

Hot Lines. During an emergency situation there occasionally develops a need for a special circuit covering two points between which high precedence traffic is heavy. Where such a need occurs between points within a Section, the special circuit can be set up by the Section-net manager or the SEC. Where it involves points in different sections in the same Region, the NTS Region net manager is responsible. Where the two points are in different Regions but the same Area, the Area net manager would make the arrangements. And where the two points are in different Areas, the TCC director assigns two of his functionaries to the task. Such special circuits are called "hot lines," set up *only* when there is enough high-precedence emergency traffic to keep them busy, and are discontinued promptly when such a condition ceases to exist.

Not all emergencies and emergency situations are predictable from a national standpoint; in fact, very few of them are. ARPSC officials, whether their principal activity is in the AREC or NTS sphere, must have freedom of action and movement within a set of general principles, the latter being for the purpose of guiding them, not restricting them. What nets should be activated in a given situation, how often the NTS cycle should operate, what special circuits need to be set up and how this can best be done – all these are matters that have to be decided as the situation develops, by SECs, ECs and NTS net managers on the scene best qualified to decide them.

The general principles are these: (1) NTS nets will be activated in accordance with the emergency situation by their respective managers at the request of AREC officials, and (2) special inter-Section circuits will be set up by National Traffic System net managers – to handle such emergency-precedence traffic as or if the need for them develops. The detailed procedure may vary considerably from place to place.

III – AMATEUR RADIO EMERGENCY CORPS

The Amateur Radio Emergency Corps is in effect the "emergency" division of ARPSC and consists of licensed amateurs who have voluntarily registered their qualifications and equipment for communication duty in the public service when disaster strikes. Every licensed amateur, whether or not a member of ARRL or any other local or national organization, is eligible for membership in the AREC. The only qualification other than holding a license is a sincere desire to serve. Since AREC is an amateur service, *only* amateurs are eligible for membership. Citizens Band operators and holders of third class commercial radiotelephone permits, not being amateurs, are not eligible for participation. *The possession of emergency-powered equipment is desirable, but is not a requirement for membership.*

Principles of Emergency Communication

It is impossible to state exact rules to try to cover *every* situation that will arise. The good average amateur faced with an emergency situation may, however, benefit greatly from certain rules of thumb. These rules are, or should be, part of his training in his AREC group. They are presented herewith somewhat at random and should be digested by all amateurs, whether active in emergency communications preparation or not.

1. Keep the QRM level down. In an emergency, many of the most crucial stations will be weak in signal strength. It is most essential that all other stations *remain silent* unless they are called upon. When in doubt as to whether or not to throw on your transmitter, don't. Our amateur bands are very congested. If you want to help, study the situation by *listening.* Don't transmit unless you are sure you can help by doing so. Don't ever break into an emergency net just to inform the control station you are there if needed.

2. Monitor established emergency frequencies. Many localities and some geographical areas have established emergency frequencies on which someone is always (or nearly always) monitoring for possible calls. When not otherwise engaged, it is helpful simply to sit and listen on such frequencies, some of which are used for general rag-chewing as well as emergency preparedness drilling. There are several accepted emergency calls. On c.w. the traditional QRRR will usually attract attention; SOS (without spaces) is universally recognized but has some legal aspects that should be considered where the need is not truly crucial. On voice, one can use "CQ Emergency," "MAYDAY" (universal, the phone equivalent of SOS) or, to break into a net or conversation, the triple "break."

3. Avoid spreading rumors. During an emergency, especially on the phone bands, you may hear almost anything. Unfortunately, much misinformation is transmitted. Rumors are started by expansion, deletion of amplifying or modifying words, exaggeration or interpretation. All addressed transmissions should be officially authenticated as to their source. They should be repeated word for word, if at all, and only when specifically authorized. In an emergency situation, with everyone's nerves on edge, it is little short of criminal to make a statement on the air without foundation in authenticated fact.

4. Authenticate all messages. Every message which purports to be of an official nature should be *written* and *signed.* Whenever possible, amateurs should avoid originating emergency traffic themselves. We do the communicating; served-agency officials supply the content of the communications.

5. Strive for Efficiency. Whatever happens in emergency, you will find hysteria, and some amateurs who are activated by the thought that they must be "sleepless heroes." Instead of operating your own station full time at the expense of your health and efficiency, how much better it would be to serve a shift at one of the best located and best equipped stations, suitable for the work at hand, manned by relief shifts of the best-qualified operators. This reduces interference and secures well-operated stations.

6. Select the Mode and Band to Suit the Need. It is a characteristic of all amateurs to believe that their favorite mode and band is superior to all others. For certain specific purposes and distances, one or the other may indeed be preferable. The merits of the use of each in a communications emergency should be evaluated impartially with a view to apportioning to each the type of work for which it is best suited. There is, of course, no alternative to using what happens to be available, but there are right and wrong purposes for which it might be used. Long experience has developed the following advantages:

For C. W.:

1) Less QRM in most amateur bands.

2) Secrecy of communications – contents of communications cannot be intercepted, generally speaking, by the general public, to start rumors or undue concern.

3) Simpler transmitting equipment.

4) Greater accuracy in record communication.

5) Longer range for a given amount of power.

For Phone:

1) More practical for mobile work.

2) More widespread availability of operators.

3) Faster communication for informal or "command" purposes.

4) More readily appreciated and understood by the public.

5) Better suited to short-range work.

For RTTY: Advantages (1) and (2) of c.w., advantage (2) of phone, plus greater speed in record communication than any other mode.

The well-balanced emergency organization will have c.w., phone and RTTY channels available, in order to utilize the advantages of all three as outlined above. Of course one must make the best use of whatever is available, but a great deal of efficiency is lost when there is lack of coordination or liaison between the different types of operation in an emergency. Absolute impartiality, willingness to let performance speak for itself – these are prime requisites if we are to realize the best possible results.

7. Use All Communications Channels Intelligently. The object of emergency communications is to save lives – anything else is secondary. Amateur radio is a secondary communications means; normal channels are primary and should be used if available. Emergency channels other than amateur which are available in the absence of amateur channels should be utilized without fear or favoritism in the interest of getting the message through.

8. Don't "broadcast." Many amateur stations in an emergency situation have a tendency to emulate "broadcast" techniques. While it is true that the general public may listen to many of our transmissions, they are not and should not be made for that purpose. Broadcast stations are well equipped to perform any such service. Our job is to communicate for, not with, the general public.

Organization

There are three levels of AREC organization – national, section and local. National emergency coordination at ARRL headquarters is under the supervision of the ARRL Communications Manager, who is responsible for advising all AREC officials regarding their problems, maintaining contact with federal government and other national officials concerned with amateur emergency communications potential, and in general with carrying out the League's policies regarding emergency communications. At Section level, the Section Emergency Coordinator is appointed by the Section Communications Manager (who is elected by the ARRL members in his Section) and works under his supervision. In most Sections, the SEC and SCM work together in setting up a Section emergency communications plan, and in appointing local ECs to implement it; in some, the SCM leaves it entirely to the SEC, who nevertheless must have the SCM's approval of everything he does. Some of the ARRL Sections with capable SECs are organized to the hilt. A few have scarcely any organization at all. It depends almost entirely on whom the Section members have put into office as SCM and whom he has appointed as SEC.

It is at the local level where most of the real emergency organizing gets accomplished, because that's the level at which most emergencies occur, at which AREC officialdom makes direct contact with the AREC member-volunteers and with officials of the to-be-served agencies. The local EC is therefore the key man in the AREC. This official is appointed by the elected SCM, usually on the recommendation of the SEC. Depending on how the SCM-SEC team has set up the section for administrative purposes, he may have jurisdiction over a small community or a large city, an entire county or even a group of counties. Whatever jurisdiction is assigned, the EC is in charge of *all* AREC activities in his area, not just one interest group, one agency, one club or one band.

Special interest groups are headed up by "assistant emergency coordinators," designated by the EC to supervise activities of groups operating in certain bands, especially v.h.f., which play an important role at the local level; but they may be designated in any manner the EC deems appropriate – for example, an s.s.b. group, a Red Cross group, a mobile group, a club or the area on the other side of town. If you think of the ECs as the captains or lieutenants of the AREC, the assistant ECs are the sergeants.

These assistants, with the EC as chairman, constitute the local AREC "planning committee" and meet together from time to time to discuss problems and plan projects to keep the AREC group active and in a high state of training.

There are any number of different situations and circumstances that might confront an EC, and his AREC group should be organized in anticipation of them. His job is not likely to be monotonous or humdrum. An EC for a small town might find that the licensed amateur group is so small that appointing assistants is unnecessary or undesirable. On the other hand, an EC for a large city may find that even his assistants need assistants and sometimes it is necessary to set up a special sub-organization to handle it.

Official Contact

One of the most important duties of the EC is contact with officials of the respective agencies which his AREC group hopes to serve in an emergency. The EC is a promoter as well as an organizer. If the man appointed is not particularly good at this sort of thing, he may delegate this function to an assistant who is better qualified, but in this case the EC should accompany his promotional assistant on introductory and exploratory meetings. They might start with the head man (let's call him the mayor), and work from there, perhaps with the help of a letter of introduction from the mayor himself, through the rounds of civil defense, Red Cross, Salvation Army, police and fire departments, newspapers, radio and TV stations, utilities companies, large industrial concerns and officials of lodges and other prominent civic groups. The more people who know about and are favorably impressed with you, the wider your circle of acquaintances, the greater your knowledge of their problems and their knowledge of yours, the more likelihood that you will be able to work together in harmony in a communications emergency.

When interviewing an official (try to see the head man himself, don't settle for a subordinate unless you have to), keep foremost in mind that you are *offering* him something, not *asking* him for something – and make sure he understands that too. He will be much more inclined to listen; people are asking him for something all the time. Be courteous, respectful, brief and concise, but at the same time forceful and vigorous. Don't be apologetic, but don't be arrogant or "pushy."

Circumstances will vary the most effective approach. Depending on how you "size up" the person you are talking to, it is likely that he will sit back and wait for you to "spill it," since you asked for the interview. So speak distinctly, clearly, don't make him have to strain to hear or understand you, and yet try to make your tone of voice conversational. Smile! Be serious, but engaging. Nothing wrong with telling a joke, if it seems to fit the situation. In the average situation, something like this might be appropriate:

"Mr. Zilch, my name is Dick Roe. I'm a licensed amateur radio operator. The amateurs of this town are getting together to form a unit of the Amateur Radio Emergency Corps, a division of a national organization called the Amateur Radio Public Service Corps. My title is emergency coordinator. Here's one of our decals, which you may have seen on some of our mobile units around town. We're all volunteers, doing it because we like it. Most of us are members of the American Radio Relay League, the national amateur radio society.

"What we are trying to do is set up facilities to provide emergency amateur radio communications in the event it is needed. (Here you can remind him of some emergency in the past, or if none you can tell him what happened elsewhere that *could* happen there.) My main purpose in coming here is just to meet you and let you know what we are up to, so you will remember us. If you wish, we can discuss any of your possible emergency communications needs. The whole thing need cost you nothing. We are doing it for the community and for amateur radio, and for our own satisfaction."

Such salesmanship is a part of the EC's job, but it's easier than most salesmanship because the "customer" doesn't have to shell out. True, it takes money, time, equipment and facilities to run an AREC group properly, and potential "customers" can be a big help in supplying these. You need make no secret of this as the acquaintanceship develops. But the best approach is not that you want their help, but that you are offering to serve *them*.

Part of salesmanship experience is the "old brush-off," but persistence pays off. Keep the door open, even to officials who seem inclined to slam it in your face. You never know when the situation will change and you will suddenly find yourself welcomed instead of abhorred. Discouragement is one of the obstacles all ECs have to face; don't let it be a road block.

Operation

There is no specific point at which organization ceases and operation commences. Both phases are concurrent at all times, because a living organization is a changing one, and the *modus operandi* of necessity changes with changes in the organization. The EC gets together with his planning committee as soon as organization is far enough along to make the first stages of implementation possible, and they draw up an operating plan. Just what shape this plan will take depends entirely on what the EC has to work with. He uses what he has, and leaves provision in the plan for what he hopes, wants, is trying to get. In an operating plan for the AREC, *flexibility* is the keynote. What you have to work with today you may not have tomorrow, or you may have more. The plan has to be geared to your local situation, no two of which are exactly alike. The diagram (Fig. 2) shows how an AREC plan can be set up for a rather large city. Some modification or extension of it might well be used for yours.

Usually local AREC operation will take the form of nets. In the average active group there will probably be a couple of v.h.f. nets, maybe a low frequency phone net. It is usually not possible to have everyone operating in a single net because there are too many different interests involved in the average group of amateurs, each group equipped for its own specialty. Usually, however, there are at least one or two individuals whose interest is varied enough to make them valuable as liaison operators among the nets – for local AREC nets must have liaison to be effective. A good way to accomplish liaison when the required versatile amateurs just are not available is to set up an amateur radio control center, as shown in the diagram, where internet traffic can be centralized and distributed, and where traffic destined to and coming from outside points can be handled.

This brings up the important matter of outside contact. No AREC group is a complete operating entity unless it has regular and reliable radio contact with the "outside." Our national AREC plan envisages that this shall be accomplished by the National Traffic System.

The amateur radio control center (or whatever name you want to give it) must be part of each local net and at the same time report into the Section NTS net, or one of them if there are more than one, or into *some* NTS net if there is none in the Section. If there is no amateur radio control center as such, then stations designated by the EC serve as liaison to NTS nets. *Whatever circuit is used, it can be made reliable only by frequent use in normal times.* AREC nets, to be effective in emergencies, should conduct sessions at least once per week, make the required NTS connection and serve as "local" NTS nets for such an operation.

Use of AREC nets in normal times combined with special operation of NTS in emergency times (see the section on the National Traffic System) is what binds AREC and NTS together to form ARPSC.

Adjacent Liaison

In addition to maintaining local liaison among nets within an AREC area of jurisdiction and with an NTS net, it is always helpful and sometimes essential to maintain connection with adjoining AREC groups. Very frequently such groups have to work together. Emergencies have a habit of not observing arbitrary jurisdictional or political boundaries. Therefore, ECs of adjacent communities, counties or whatever areas are used should know each other and be familiar with operating patterns, and in preparation for emergency operation have a means for working together, even though they may be in different ARRL Sections, states, divisions, call areas, or even countries. In organizational competition, you may exult that your group is superior to an adjoining one, but in emergency operation the better *all* AREC groups are organized the more effective is the service rendered.

In Sections having large populations it is usually advisable to maintain regular connecting links between large cities, because traffic is almost certain to be heavy between and among them in an emergency. Some Sections and states are even organized on this basis, with a Section net interconnecting all such "key" cities on a 24-hour emergency basis, and intra-city "intercom" nets on v.h.f. Where population is more or less concentrated in several urban areas rather than scattered throughout rural areas, this can be an effective basis for your Section operating plan.

It can be seen from the foregoing that whatever plan of operation is used, the principal and essential element is that we all work together, regardless of our personal operating preferences, to accomplish the ultimate public service objective. This means phone men and c.w. men, v.h.f. men and h.f. men, RTTY and s.s.b. enthusiasts, mobileers and armchair operators, techs and generals, novices and old timers, high school students and graduate engineers. *The aim is to provide a place in the AREC for any amateur who wants to take part.*

Alerting "check lists"

ECs and SECs should have worked out beforehand the procedure to be followed in the event of an emergency. This is a most important prerequisite to any emergency operation. Emergency coordinators should:

(a) Activate your AREC group. This should be in accordance with a pre-arranged alerting procedure worked out with your planning committee. Well-organized groups have telephone "fan-out" systems by which the EC calls two or three members, each of whom calls two or three others, each of whom calls two or three more, etc., until the entire group is alerted. In the event no telephone communication is available (which, in a communications emergency, might well be the case), it should be understood that every AREC member will report into his assigned net on its predetermined frequency, as soon as he learns about the emergency.

(b) Assess the situation with local officials of the Red Cross, civil defense or any other agencies involved. If a requirement exists for communication with points outside your area of jurisdiction, advise your SEC the extent of the need for liaison, purpose, how long it will be needed, with what points in particular, if any, etc. Such contact can be made by telephone, or if necessary by relay through a station who has telephone communication if you have not. Or, in those sections best organized and prepared, the SEC will be self-alerting and will appear on your emergency net frequency. In any event, you should have some means (other than landline) of contacting your SEC at any time.

(c) Designate (*pre*-designate, if possible) certain stations to maintain liaison with the (or a) Section NTS net. Even if the emergency is local and you have no traffic going out, there might be some traffic coming in which you will want to handle on an appropriate precedence basis.

(d) Almost as important as alerting your AREC group and the SEC if necessary is the calling off of such an alert or the "securing" of emergency nets when there is no longer a need for them. It is not good management to hold individuals or groups on

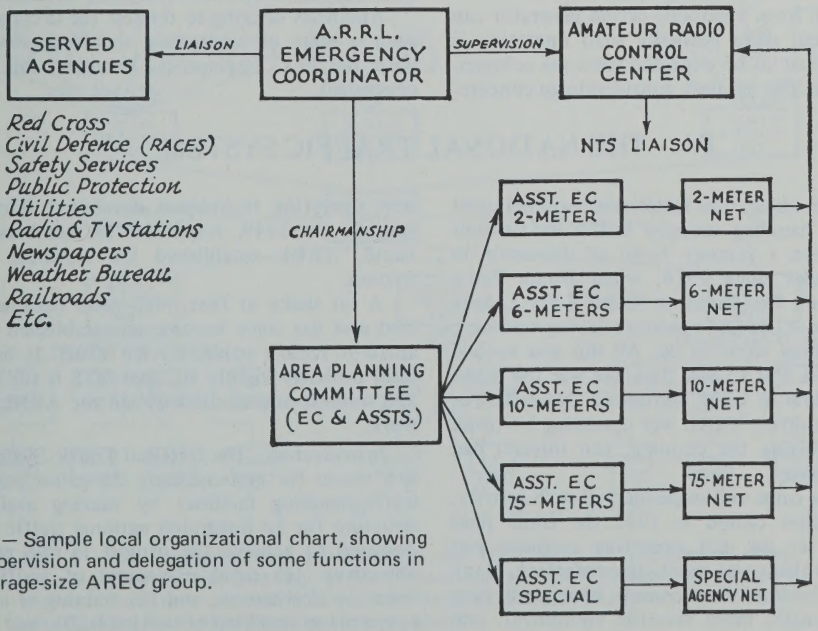

Fig. 2 — Sample local organizational chart, showing EC supervision and delegation of some functions in an average-size AREC group.

an alert basis unnecessarily. Advise your SEC also when there is no longer a need for emergency operation.

Section Emergency Coordinators should:

(a) Be available at any time to any EC in your Section. Monitor any local emergencies and be ready to assist as needed. Know your ECs and the frequencies on which local AREC/NTS nets operate.

(b) Contact Section NTS manager(s) in the event your assessment of any emergency situation seems to require you to request extraordinary activation of the Section NTS net(s). Have arrangements for making such contact whether or not telephones are working.

Equipment Considerations

It is not to be expected that every amateur will prepare himself for an emergency by having a complete and separate self-powered station, although a large number of individuals and groups do so. There is, however; no reason why any enterprising amateur cannot prepare his station for an emergency by having an emergency power supply ready and a quick means for utilizing all or part of his regular station equipment as an emergency-powered station. The emergency power supply can be anything from a small transistor supply operated from batteries to a large gasoline-driven generator.

Generally speaking, equipment most suitable for emergency use is that equipment which contains the utmost in compactness, portability and versatility. Within these three requirements, emergency equipment is little different from any regular station equipment. It is chiefly the power supply which determines whether or not a piece of equipment is useful in emergencies.

Operation from a gasoline-driven generator can be discounted, since normally such operation is identical to that to be expected from the commercial a.c. lines. The primary considerations concerning emergency power have to do with battery-operated power supplies. Transistor packs are used almost exclusively, these days. Once such a power supply is available, it is usually a simple thing to adapt your regular station equipment to use it in an emergency. The "Mobile and Portable-Emergency Equipment" chapter of the ARRL *Radio Amateurs Handbook* contains full details concerning the construction and use of such power supplies.

FCC Emergency Declarations

Section 97.107 of the Amateur Rules and Regulations sets down procedure for emergency declarations. Upon receipt of advices from the FCC Engineer-in-Charge of the district concerned, FCC may designate an emergency area and frequency segments or bands to be used exclusively for communications concerning the emergency condition. Amateur stations designated (by FCC) may be called upon to assist in spreading the word and in assisting to monitor and warn non-complying stations. Such stations may operate within the emergency segments or bands, but preferably should operate on frequencies just adjacent to these segments or bands, in order to avoid any possibility of QRM to emergency operation. In advising other stations of the emergency, they will refer to Section 97.107, the date of FCC's announcement, the area affected, and the bands or band segments designated for exclusive emergency operation. Beyond giving full information, they should not discuss the declaration, but inform FCC the identity of any amateur who fails or refuses to comply.

These special conditions will apply until FCC officially terminates the emergency declaration.

Amateurs desiring to request the declaration of such a state of emergency should communicate with the FCC Engineer-in-Charge of the district concerned.

IV – THE NATIONAL TRAFFIC SYSTEM

Traffic Handling. The fastest and most efficient method for handling message traffic by amateur radio has been a primary topic of discussion in amateur circles since 1914, when Hiram Percy Maxim formed the American Radio Relay League for this purpose. At first random relaying was used, then trunk lines were set up. All this was washed out by World War I, and after the war the trunk lines were slow in being revitalized. Nevertheless, by the mid-thirties ARRL was operating 14 trunk lines criss-crossing the country, and interest had never been higher.

Again war came and suspended all such activity. After hostilities ceased in 1945 the trunk lines were again set up, but operating methods had changed and there was much dissatisfaction. Many considered the trunk lines concept obsolete in view of longer ranges, more versatile equipment, and new operating techniques developed during the war. So, in 1949, responsive to membership demand, ARRL established the National Traffic System.

A bit shaky at first, NTS soon became stabilized and has since become an established part of amateur radio's public service effort. It has been said, probably rightly so, that NTS is the tightest and solidest organization within the ARRL framework.

Introductory. The National Traffic System plan is a means for systematizing the nation's amateur traffic-handling facilities by making available a structure for an integrated national traffic facility designed to achieve the utmost in two principal objectives: (1) rapid movement of traffic from origin to destination, and (2) training of amateur operators in handling of written traffic and partici-

pating in directed nets. These two objectives, which sometimes conflict with other, are the underlying considerations in the National Traffic System which is about to be described.

This system is in daily operation. Its personnel consists mainly of those operators who while interested in traffic handling, are unable, either through necessity or inclination, to spend more than one or two evenings a week in this pursuit. Thus, NTS is a step *away* from the traditional "iron man" type of traffic handling which characterized our "trunk lines" of yesteryear. If you can spend one evening a week handling traffic and are interested in doing so, NTS can use you.

General. The National Traffic System is an organized effort to handle traffic in accordance with a plan which is easily understood, is basically sound, and which utilizes modern methods of network traffic-handling in general acceptance today. It encompasses all parts of the ARRL Field Organization (U.S., Canada and possessions). At the present time no coverage is provided by the system for other points, although individual members may provide such coverage from time to time.

NTS is not intended as a deterrent or competition for the many independently-organized traffic networks. When necessitated by overload, the facilities of such networks can function as alternate traffic routings where this is indicated in the best interest of efficient message relay and/or delivery.

One of the most important features of NTS is the "system concept." No NTS net is an independent entity which can conduct its activities without concern for or consideration of other NTS nets. Each net performs its function and *only* its function in the overall organization. To whatever extent nets fail to perform their functions or perform functions intended for other nets, to this extent is the overall system adversely affected.

Nets may sometimes find it necessary to adopt temporary expedients to insure movement of traffic, and this is considered improper operation only when no attempt is made to return to the normal schedule. Nevertheless, improper operation of any NTS net is the concern of *all* NTS nets, and every effort should be made to assist in returning any nonfunctioning or improperly functioning net to its normal operation.

Membership. Individual station participation in NTS is recognized by issuance of certificates (see p. 15). Organizationally speaking, the "members" of NTS are the nets which participate therein. Most such nets were created and organized for NTS purposes only and operate at specific times for specific purposes to be described later. Procedures are somewhat specialized, particularly at Region, Area and TCC levels.

Frequently ARRL headquarters is asked how a net may become a part of NTS. This usually isn't easy, because NTS is not a "club for nets" which any existing net may join at will. In addition, making nets a part of NTS is less a matter of official action than a "state of mind" of the net itself. In this connection, the following points deserve mention:

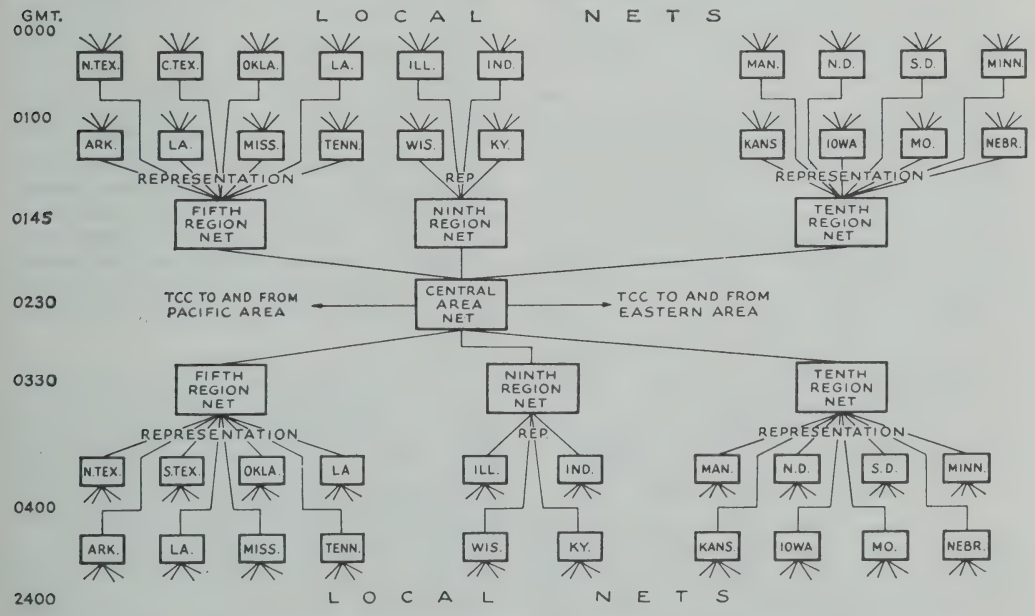

Fig. 3 — A diagrammatical portrayal of the NTS setup in the Central Area, showing times of net meetings at the various levels in GMT. Note that the early and late functions of local nets are combined at 2400/0000. Some of the other net echelons have alternatives not shown above.

a. Nets operating within ARRL Section boundaries, or otherwise at local or section level, may become a part of NTS by performing the functions of such (see paragraphs on Section Nets, page 13).

b. Nets whose coverage extends beyond Section boundaries but within Region (roughly, call area) boundaries may become a part of NTS only by foregoing their general membership and setting up to operate as a session of the Region net (see paragraph on Region Nets, page 13). Such nets would act as one of that Region's net sessions and would be under the jurisdiction of the Region net manager appointed by ARRL. In all NTS history so far, no net has succeeded in adapting itself to the NTS Regional function. All present NTS Region nets were organized specifically for that purpose..

c. Since operation at Area level is so specialized, it is not possible for nets whose coverage extends beyond Region boundaries to be a part of NTS at any level.

d. Any net which becomes a part of NTS is expected to observe the general principles of NTS procedures as outlined in Appendix I herewith.

e. Generally speaking, participation in NTS is best performed by individual-station participation in an already-existing NTS net, at whichever level.

f. Lack of recognition as an NTS net does not imply that such a net is without ARRL recognition or support. All public service nets on which information is received are included in the League's net information and activities summarized monthly in the appropriate part of *QST*. Although NTS is the League-sponsored organization for systematized traffic handling, it is far from being the League's only interest in public service communication.

Mode. The National Traffic System is not dedicated specifically either to phone or c.w., or any other type of emission, nor to the exclusion of any of them, but to the use of the best mode for whatever purpose is involved. The aim is to handle record traffic *systematically,* by whatever mode best suits the purpose at hand. Whether phone, c.w. or radioteletype is used for any specific purpose is up to the net manager or managers concerned and the dictates of logic. There is only one National Traffic System, not separate ones for each mode. Modes used should be in accordance with their respective merits, personnel availabilities and liaison practicalities. Whatever mode or modes are used, we all work together in a single and thoroughly integrated National Traffic System.

Principles of Operation

The National Traffic System consists of four different levels of nets which operate in an orderly time sequence to effect a definite flow pattern for traffic from point of origin to point of destination.

A message flows through the National Traffic System in a manner similar to a traveler on the nation's airlines. The four net levels are similar to stages of air travel, some of which is of necessity transportation to and from airports. An air traveler must go through a number of stages on a long journey, typically as follows:

Ground transportation to the nearest airport is the first stage. This stage itself is often in two steps, first transportation to a point at which the airport bus may be boarded, then the bus ride to the airport itself. Then the traveler boards a small airliner which takes him to a large city airport, whence he boards a transcontinental jet liner which takes him to a large city airport near his destination, a smaller feeder airline takes him to the airport of his destination city, the airport bus takes him to a point in the city and a taxi then takes him to his actual destination. Of course some of these stages may not be necessary because he may already be *in* a large city, or his destination may *be* the large city the jetliner takes him to. Also, it may often be quicker (but wasteful of facilities) for the traveler to go *directly* to his destination. However, assuming a traveler must go through all the stages and a message must pass through all normal nets, the following comparison can be made:

Air Travel	*Message thru NTS*
Taxi to airport bus station.	Local liaison to Section Net.
Bus to airport.	Section liaison to Region Net.
Air to large city airport.	Region liaison to Area Net.
Jetliner to large city airport near destination.	TCC hop to destination area.
Feeder airline to city of destination airport.	Area to Region Net.
Airport to airport bus station.	Region to Section Net.
Taxi to exact destination.	Section to Local Net and delivery.

Of course not all messages (or travelers) are transcontinental, and in some cases the message can be delivered directly from a higher level without going through all the stages. For example, a message going from a point in one Section to a point in another Section in the same Region would "get off" at Region level and never reach the Area net or TCC.

Local Nets are those which cover small areas such as a community, city, county or metropolitan area not a complete ARRL Section. They usually operate by v.h.f. on voice, at times and on days most convenient to their members and are often designated as "emergency" (AREC) nets that do not specialize in traffic handling. They are intended mainly for local delivery of traffic on an emergency basis, inasmuch as such delivery could ordinarily be effected conveniently by non-toll telephone. Some NTS Local nets operate on a daily basis, just as do other nets of the system, to put the traffic as close as possible to its actual destination before delivery – a matter of practice in a procedure that might be required in an emergency.

Local nets are the newest in the NTS concept and are still the loosest part of the organization. The principal requirement for identification with the system is *regular* liaison with the Section NTS net.

Section Nets. Organizational and procedural lines begin to tighten at the Section net level. Coverage of the Section may be accomplished either by individual stations reporting in, or by representatives of NTS Local nets, or both. Ordinarily, all Section amateurs are invited to take part; however, in a high-population Section with several metropolitan areas covered by Local nets, representation may be by such liaison stations *plus* individual stations in cities or towns not covered by Local nets.

The Section may have more than one net (e.g., a c.w. net, an a.m. net, a s.s.b. net, etc.), or two or more sections may combine to form a single net operating at Section level, if low population or activity seem to make this desirable. Section nets are administered through the office of the Section Communications Manager, with authority for this function usually (but not necessarily) delegated to appointed route managers, phone activities managers or designated net managers. In the case of combined-Section nets, officials of the Sections concerned should collaborate on the designation of a qualified amateur to manage the net. The purpose of the Section net is to handle intra-Section traffic, distribute traffic coming down from higher NTS echelons, and put inter-Section traffic in the hands of the amateur designated to report into the next-higher NTS (Region) echelon.

Region Nets cover a wider area, such as a call area. At this level the object is no longer mass coverage, but *representation* of each ARRL Section within the Region. Participants normally include (1) a net control station, designated by the Region net manager, (2) representatives from each of the various Sections in the Region, designated by their Section net managers, (3) one or more stations designated to handle traffic going to points outside the Region, designated by the Region net manager, (4) one or more stations bringing traffic down from higher NTS echelons, and (5) any other station with traffic for some point within that Region, but not within his own Section. There may be more than one representative from each Section in the Region net, but more than two are usually superfluous and will only clutter the net; however, all Section representatives are required to represent the entire Section, not just their own net.

The purpose of the Region net is to exchange traffic among the Sections in the Region, put out-of-Region traffic in the hands of stations designated to handle it, and distribute traffic coming to the Region from outside among the Section representatives. Region nets are administered by net managers appointed by ARRL headquarters under the supervision of the ARRL communications manager.

Area Nets. At the top level of NTS nets is the Area net. In general, the Area net is to the Region net what the Region net is to the Section net; that is, participation at Area level includes (1) a net control station, designated by the Area net manager, (2) one or more representatives from each Region net in the Area, designated by the Region net managers, (3) stations designated to handle traffic going to other Areas, (4) stations designated to bring traffic *from* other Areas, and (5) stations having traffic for points in the Area not their own Region. Points (3) and (4) are functions of the Transcontinental Corps, to be described later. There are three Area nets, designated Eastern, Central and Pacific, the names roughly indicating their coverage of the U.S. and Canada except that the Pacific Area includes the Mountain as well as the Pacific states. Area nets are administered by managers appointed under the jurisdiction of the ARRL communications manager.

Transcontinental Corps. The handling of inter-Area traffic is accomplished through the facilities of the TCC. This is not a net, but a group of designated stations who have the responsibility for seeing that inter-Area traffic reaches its destination Area. It is administered by TCC directors, one for each Area, who assign stations to report into Area nets for the purpose of "clearing" inter-Area traffic, and to keep out-of-net schedules with each other for the purpose of transferring traffic from one Area to another. Further details of TCC operations are contained in Appendix III (see p. 22).

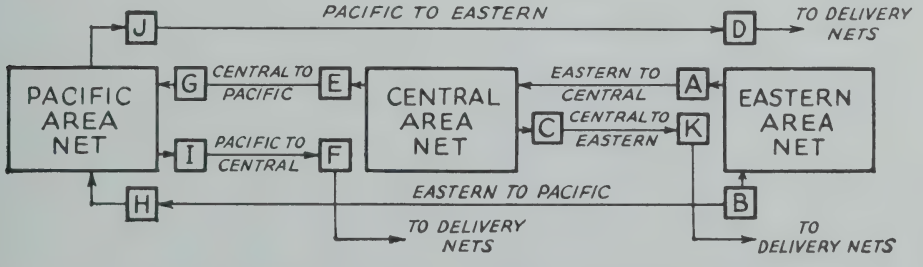

Fig. 4 — How the TCC works. Small blocks denote daily station functions, station A being the only one that reports into an Area Net other than its own. Note that traffic from east to west goes into area nets while traffic from west to east may go into delivery nets to save time.

Sequence of Net Meetings. The order in which the various nets meet is essential to the system. Nets in each Area meet in the same sequence: Section first, then Region, then Area, followed by "late" meetings of Region and Section nets in that order. The sequence, or cycle, starts first in the Eastern Area, then an hour later in the Central Area, and two or three hours later in the Pacific Area, in general following the sun across the country from east to west. Local nets meet pretty much at random, but we show them as meeting prior to Section nets as a part of the cycle.

Normally, there is one cycle per day. If the cycle is completed, traffic originated one day will reach a point from which it can conveniently be delivered the same day if it is destined to a point in the same Area or any Area to the west. If going the opposite direction, it will reach its destination one day later. Appendix IV (see p. 23) traces a sample message through the system.

NTS is a volunteer traffic system, and it is not always practical to find traffic stations able to participate in nets at various levels at particular times. While in principle NTS nets find the personnel who can participate at the time designated, rather than change the time to suit the personnel, there is always a certain amount of non-uniformity in net meeting time, and options may be used at the discretion of the net manager. However, any such options are to be considered temporary and a return to normal NTS- recommended operating times should be made as soon as possible. The times designated in the chart (Fig. 3) are, therefore, the *normal* NTS operating times, and the nets listed show the *starting* times of those nets. The identity of participants in each of these nets is discussed in the previous section.

Options. As already mentioned, certain options can be used to good advantage during seasons or parts of the sunspot cycle when the above schedule is not suitable, or when the operation of part of the system is erratic, adversely affecting other parts of the system. The normal sequence has been outlined above. But suppose, for example, the Section (2) net does not convene in *any* of the Sections in a certain Region; it is then not necessary that the Region net (2) convene at the designated time if it is more convenient for the majority of participants to convene the next day before Section net (1). As another example, during low sunspot activity Region net (2) and Section net (2) meetings may be completely washed out by conditions; these meetings may be held instead the next day during daylight hours when the long skip is not so prevalent. Whenever such changes are made, headquarters should be notified so that information on them will be available at a centralized point. In NTS, the right hand should always know what the left hand is doing. No NTS net should consider itself independent of or unconcerned with the functioning of other parts of the system.

Deviation from Normal Routing. Failure to use the normal routings described above, if carried to the extreme, will result in "strangulation" of one or more NTS nets at Region or Area level. That is, if Section nets send representatives to other Section nets to clear traffic direct instead of through Region net, the Region net will "starve" for traffic. Similarly, if Region nets maintain liaison with each other direct instead of through the common medium of the Area net, the latter will have little traffic and will not prosper. It is in the interest of efficiency, organization, system, training and conservation of skilled personnel to use the NTS structure as it is intended to be used.

Adherence to Schedules. Since NTS depends for its efficiency on chronology of net meetings, it naturally follows that adherence to NTS schedules is of the greatest importance. Particularly, liaison stations should not be held on any NTS net beyond the time they are scheduled to meet another net, *even if all traffic has not yet been cleared to them.* Leftover traffic should be held, put on alternate routes, or handled by special schedule later.

Along the same line, NTS nets should not operate beyond the time allotted to them. Normally, the following periods are provided for operation at each level: Local nets, 30 minutes, Section nets, 45 minutes (1) and 30 minutes (2). Region nets, 45 minutes (1) and 30 minutes (2). Area nets, one hour.

Alternate Routings. Deviations are made from normal routings *only* when normal channels are for some reason not available. A return to the use of normal NTS channels should be made as soon as possible. The net manager shall be the judge as to whether normal facilities are available, satisfactory or adequate in making any deviations. Alternate routings, if and when necessary, can include regular or specially-arranged schedules, direct liaison to the NTS destination net, or use of the facilities of independent networks.

QNI Policy. National Traffic System nets at Local and Section level are open to all amateurs in the coverage area of the net. At Region and Area level, participation is normally restricted to representatives of Sections, and designated liaison stations. However, stations from outside the coverage area of the net concerned, or other not-regularly-designated participants who report in *with* traffic will be cleared provided they can maintain the pace of the net as to procedure, speed, and general net "savvy." Such stations reporting in *without* traffic will immediately be excused by the NCS unless they can supply outlets not at that time available through normal NTS channels. Visitors to NTS nets should bear in mind that NTS nets operate on a time schedule and that no offense is intended in observance of the above QNI policy.

Boundaries. NTS net coverage areas are strictly confined and strictly observed in daily operation of

the system. At Section level, by ARRL Section boundaries. At Region level, in accordance with the grouping of the Sections into NTS Regions based originally on call areas. Some of the Regions are on a call area basis (1st, 2nd, 3rd and 8th), but others cover parts of two or more call areas. At Area level the original basis was standard time zones, and the boundaries still roughly follow these lines without dividing any Sections. The NTS functional diagram (Fig. 3) and routing guide (p. 24) give full details of boundaries of the various NTS echelons of operations.

Sections can be changed from one Region to another at the request of the SCM thereof provided no disruption of the system's operation is involved. Normally, such requests will be considered only for Sections located on boundary lines between Regions.

Nomenclature. NTS nets at Region and Area level officially carry the name of the Region or Area they cover (e.g., First Region Net, Eastern Area Net, etc.). Net "designations" at these levels vary somewhat (e.g., First Region Net is 1RN, Fifth Region Net is RN5, Twelfth Region Net is TWN and Eleventh Region Net, the only Canadian Region net, calls itself Eastern Canada Net and uses the designation ECN). Section nets customarily carry the name of the Section or Sections they cover, but the actual name used is optional with the net. Some examples are Pine Tree Net (Maine), Buckeye Net (Ohio) and Northern California Net (five Calif. Sections).

Combined Section Nets. Some ARRL Sections which have little or no traffic interest have not organized Section Nets, while in some cases two or more Sections have combined their facilities into a single net operating at Section level. This latter practice is considered a desirable one where circumstances make it necessary and feasible, and such a combined-Section net can participate in NTS in the same way as any other Section net, with each representative thereof representing both (or all) Sections covered.

It is recommended that traffic men in Sections which do not at present boast a Section traffic net take steps to organize one for NTS representation. Lacking this, it might be possible to participate, temporarily at least, in the NTS net of an adjoining Section, and be considered members of that Section's net until such time as it is feasible to establish one. Such an arrangement, of course, requires the acquiescence of the SCM and net manager of the Section net concerned.

Limited Load Capability. Because the system operates on a time schedule with a definitive flow pattern, NTS breaks down under heavy load just as do all communications systems. Thus, in normal times, the system observes the "limited load" policy. It is the general policy on NTS to strive for handling the greatest quantity of traffic through *efficiency* rather than through long hours of operation. NTS nets must *begin and terminate* within certain time limits in order that liaisons can be maintained without delay. If traffic is not all cleared within the time limit, it is considered "overflow" traffic and must use alternative routings or be held over.

Observation of Time. In order to avoid confusion and effect standardization, NTS nets should endeavor to meet at the times officially designated for them in this booklet (see fig. 3, p.11).Where temporary departures are necessary, care should be taken that this will not adversely affect the traffic flow or cause interference to other NTS nets because of time differences.

It has become customary for NTS nets to change their operating times to one hour earlier during the warm-weather months, to avoid confusion. Nevertheless, it should be remembered that operating on local "daylight saving" time *is* a change and should be regarded as such.

Frequencies. There is no specific NTS frequency plan at the present time. Each NTS net selects its own operating frequency in consideration of its requirements, with the advice and assistance of ARRL headquarters if desired. Because in an emergency it may be necessary to operate many NTS nets simultaneously which ordinarily operate at different times, it is desirable for nets within normal interference range of each other to use different center frequencies if possible. Within this consideration, it is also desirable to concentrate NTS operation on as few spot frequencies as possible for two reasons: (1) to conserve frequency space, and (2) to make *full* utilization of those spot frequencies used in order to help establish occupancy. ARRL's Net Directory records net frequencies and times and is useful to study in planning new nets.

Manager Appointments. NTS net managers at Local and Section level are appointed or designated by the SCM. All other NTS managers are appointed at the direction of the ARRL communications manager under a procedure requiring the approval of the SCM of the Section in which the candidate resides. Net managers are appointed for no specific term of office.

Certification. NTS certificates are available at Section, Region, Area and TCC level. Section net certificates are issued by the SCM, Region and Area net certificates by the net managers. A participating station is eligible for a NTS net certificate when it has completed three months of performance (at least once per week), on an assigned basis, of one or more of three essential duties:

(1) Regular participation as a net station. In the case of Region and Area Nets, this means official representation of a Section or Region within its respective Region or Area. *No credit is given in Region or Area nets for random participation.*

(2) Liaison with other nets of the National Traffic System. This applies only to *regular* liaison in accordance with the NTS flow pattern *as assigned by the appropriate net manager.* In the

case of Section nets, liaison with their proper Region nets; in the case of Region nets, liaison with their proper Area nets; in the case of Area nets, liaison with other Area nets through regularly-assigned functions in the Transcontinental Corps.

(3) Net control station.

Certification in the Transcontinental Corps is available through the TCC Area director on completion of at least three months of regular performance of a TCC function assigned by the director.

Net managers (or TCC directors) may use their discretion in "excusing" any station working for a certificate if that station is unable to perform its regular duty in any specific instance. Net managers (or TCC directors) shall be the sole judges as to whether a duty, even though performed regularly, is performed adequately to merit certification.

Special Liaison Method. Often managers at Region and Area levels will find that while one Section or Region can send few or no liaison stations, others have sufficient personnel to send several. In such cases, it is possible and perfectly permissible for the higher-level manager to propose to the lower - level manager to arrange that any excess personnel be used to effect liaison not being properly performed through lack of available stations. *Example:* The manager of the Umpth Region Net finds that many stations are available to represent Section A in his Region, but Section B is seldom represented. He contacts the manager of the Section B Net and proposes that a Section A station be sent to the early meeting of Section B to take its "thru" (out of section) traffic. This station then brings such traffic to the Umpth Region Net to be distributed among net stations as required. Also, a Section A station in URN may be designated to receive all Section B traffic; this station then reports into the Section B Net to clear this traffic. Both receiving and sending functions must be completed for full representation.

The above is an alternative method of getting the traffic through and is under no circumstances to be used in preference to having a station from the section itself report to the Region net. Normally, liaison of a lower-echelon net to a higher-echelon net is the responsibility of the manager of the lower-echelon net.

Operating in Emergencies

The National Traffic System is an integral part of the Amateur Radio Public Service Corps, and as such is dedicated to communications during emergencies as well as the daily handling of routine third party traffic. When an emergency situation arises, NTS goes into complete or partial emergency operation depending entirely on the extent of the emergency situation and the extent of its effect. The normal once-every- 24-hour cycle is stepped up as required by the situation, so that more traffic can be handled and so that it can be handled more rapidly. In the extreme case, the cycle can operate bi-hourly, following the normal sequence but completing it every two hours instead of every 24 hours. In such a case, operation would in effect be continuous, with representation required present in all nets continuously, stations designed for this functioning replacing each other as others are dispatched to the higher or lower nets with which they make liaison.

The question arises: who alerts or activates NTS nets in an emergency and who determines which net or nets should be activated? ARRL emergency coordinators in disaster areas determine the communications needs and make decisions regarding the disposition of *local* communications facilities, in accordance with the need and in complete coordination with agencies to be served. Section emergency coordinators study the situation on a section-wide basis and make recommendations to NTS managers at Section and/or Region levels. We have already examined alerting procedures for ECs and SECs (see p. 9).

While the EC is, in effect, the manager of NTS nets operating at local levels, and therefore makes decisions regarding their activation, managers of NTS nets at Section, Region and Area levels are directly responsible for activation of their nets in an emergency situation, at the behest of and on the recommendation of ARPSC (AREC or NTS) officials at lower levels. The following "check lists" apply to officials at the levels indicated:

Route Managers, Phone Activities Managers, Section Net Managers. (1) You may be contacted in any emergency by the SEC, to activate your Section net, whether NTS or not, either to provide Section-wide contact or, in the case of NTS nets, to provide liaison with the "outside". Have some means of activating your net(s) at any time. We suggest that you make it understood in your net that in the event of an emergency, net stations monitor the net frequency. Some net stations, at locations badly needed, can be activated by telephone if need be and if available.

(2) Make contact with your Region net managers (NTS) in the event communications connected with the emergency transcend section boundaries, recommending extraordinary activation of the Region NTS net. Thus, have some prearranged method of contacting him for this purpose.

(3) Designate net stations to conduct liaison with the NTS Region net, either through another Section net or direct. This is *your* responsibility, not that of the Region net manager.

NTS Region Net Managers. (1) Any one of the NTS Section net managers in your Region may contact you should an emergency situation develop. Try to predict such contact on the basis of circumstances and be available to receive their recommendations.

(2) Make contact with your Area net manager (NTS) in the event communications connected with the emergency transcend Region boundaries, recommending extraordinary activation of the Area NTS net. Thus, have some prearranged method of contacting him for this purpose.

(3) It is *your* responsibility to see that the Region is represented in any extraordinary session of the Area net, in addition, of course to all regular sessions.

NTS Area Net Managers. There are only three of these, but their function in emergencies is of paramount importance.

(1) Maintain a high sensitivity to emergencies in your area which extend or may extend beyond Region boundaries. When one does, *take the initiative* to alert the Region net manager involved to determine if extraordinary NTS operation is indicated.

(2) In the event priority inter-area traffic is involved, contact the TCC director in your area and make arrangements for TCC representation to clear the traffic for other areas.

(3) Contact other NTS Area net managers to confer on possibilities of their having extra net sessions if deemed required to handle the traffic the TCC will bring to them. Under some circumstances, direct representation may be indicated.

(4) Maintain close contact with all Region net managers in your Area and make decisions regarding overall NTS operation in consultation with them.

Transcontinental Corps Directors. These three NTS officials will be involved only where priority traffic is to be handled between NTS Areas.

(1) Be ready to alert your TCC crew and set up special out-of-net schedules as required.

(2) You may be called upon by the Area net manager to set up "hot line" circuits between key cities involved in heavy traffic flow. Bear in mind which of your TCC stations are located in or near enough to large cities to man such circuits.

We are not so naive as to think that when an emergency arises unexpectedly, everything will go like clockwork. ARPSC officials, like everyone else, will get excited, will be prone to make hasty and not-too-well-thought-out decisions and recommendations, and the all-too-familiar disorganized scramble of unprepared amateurs now, out of the blue, magnanimously offering their obviously superior skills and equipment to the cause will add to the confusion. Thus, the more the emergency procedure can be reduced to steps previously thought out during times of low or no pressure, the better off we will be at the crucial time. Amateurs have always made a good impression through willingness, enthusiasms, flexibility and versatility in an emergency. The good impression we make can be multiplied manyfold by being ready to offer an organized, systematic service.

In an emergency situation, *the officials previously appointed for the purpose should be the "bosses" of our amateur radio facilities.* Elected administrative or policy-making officials should in such a case follow orders, like anyone else. There is no use appointing officials for emergency and training them therefor unless we fully intend permitting them to perform.

During an emergency, the function of NTS is to get high-precedence traffic from origin to destination as quickly as possible. During such time any consideration of "limited load" policy is forgotten, and other rules for NTS operation are "short-circuited" as required in the interest of prompt delivery of traffic.

V – THE RADIO AMATEUR CIVIL EMERGENCY SERVICE

After World War II, when it became evident that the international situation was destined to be tense and the need for some civil defense measures became apparent, successive government agencies designated to head up such a program called on amateur representatives to participate. In the discussions that followed, we were interested in getting two points across: first, that amateur radio had a potential for and capability of playing a major role in this program; and second, that our participation should, this time as never before, be in our own name, as an *amateur radio service,* even if and after war should break out. These principles were included into the planning by the formulation of regulations creating a new branch of the amateur service, the Radio Amateur Civil Emergency Service, RACES.

Recognition of the role of amateur radio as a public service means *responsibility*—this time, as never before, in our own name. The RACES regulations are printed in full in the ARRL License Manual, along with the rest of the amateur regulations, and will not be reprinted herein. Nevertheless, every amateur should study closely and become familiar with these rules; for civil defense, now a major function, will become our only-on-the-air function if we are plunged into war.

Segments of frequencies within the amateur bands have been earmarked for amateurs operating in this service, which requires authorization separate from regular amateur operation. See FCC RACES regulations for restrictions on use:

1800-2000 kc. (under current restrictions)
3500-3550 and 3984-4000 kc.
7097-7125 and 7245-7255 kc.
14,047-14,053 and 14,220-14,230 kc.
21,047-21,053 kc.
28.55-28.75 and 29.45-29.64 Mc.
50.35-50.75 and 53.35-53.75 Mc.
53,300 kc. (spot frequency)
145.17-145.71 and 146.79-147.33 Mc.
220-225 Mc.

What is RACES?

Ever since the RACES rules were announced in 1951, this sub-part of the amateur regulations and the new service it represents have been of greatest interest and concern to amateurs. There have been a few minor changes in these regs since they were

finalized in 1952, and one major one when the frequency segments were expanded, but there has been no change in the basic intent of RACES. It was, and still remains, *a means by which amateurs may serve civil defense communication on an organized basis,* using their own bands and much of their own equipment. It is intended that this service, where properly authorized, will remain on the air in the event of any national emergency resulting from enemy action, although the rest of amateur radio will be silenced.

Note that we say the "rest" of amateur radio. RACES is part of the *amateur* service, its regulations are part of the amateur regulations, and it operates on the amateur bands. The segments of the amateur bands it uses are *shared* with the rest of the amateur service in peacetime; in the event of war, its frequency segments would be exclusive.

Licensing Procedures

FCC does not issue "licenses" for RACES – at least, not in the ordinary sense. Rather, it issues "authorizations" for existing amateur stations to operate in this service. Such authorizations can be applied for only through an existing civil defense organization, usually at local level. Thus, you have to have organized civil defense before you can have RACES. Although station authorizations are issued to individuals, the sponsoring c.d. organization is very much in the picture at all stages, as we shall see.

There are three basic requirements for RACES authorization. The first is a complete civil defense communications plan, drawn up in accordance with the RACES rules (97.163(i)). Second is appointment of a RACES radio officer, who must be holder of an amateur license (other than novice or technician) or of a commercial first or second class radiotelegraph or radiotelephone. The RO must be certified to FCC on a form provided for that purpose (482). Third is application for authorization of a RACES station or stations on FCC Form 481. Such application is made through the RACES radio officer, and applicant must be the holder of an amateur operator license other than novice or technician, *and* an appropriate amateur station license. (In other words, no new station licenses are issued for RACES.)

The three basic essentials (communications plan, certification of the RO and station authorization application or applications) are sent upstairs to state civil defense, whence they go to the appropriate OCD regional office, thence to FCC where the plan is placed on file, the radio officer is certified and the station authorization(s) issued. At any one of these points, of course, the application may be returned if there is anything wrong with it. Once the papers are approved and placed on file, subsequent applications and minor modifications can be made without going through the whole procedure.

FCC does not issue operator licenses or authorizations for RACES. This is done at the sponsorship level by the c.d. director on the basis of operator licenses already held. That is, the c.d. director issues "certifications" to those enrolled in local c.d. whose FCC operator licenses make them eligible to operate in RACES. Just what kind of license holders are eligible for what kind of operation is discussed in detail in the regulations.

Operation

RACES operation differs considerably from regular amateur operation, mostly because of the necessity for security (looking to operation during war) and the use of non-amateur operators in some cases. In addition, the RACES regulations provide for some exceptional operation not normally used by amateurs.

Let's point out something basic before we get into this. When we say RACES, as distinguished from "regular" amateur, we do not mean to imply that RACES is *not* amateur. Nevertheless, there are certain differences that obtain when operating as RACES which are more restrictive than when operating normal amateur. In normal times, an amateur station authorized for RACES may drop its RACES mantle at any time and assume its normal amateur identity, and operate accordingly – but in this case, the station must operate strictly according to the regular amateur regulations (Part 97, sub-parts A through E). When it is operating in a RACES network under c.d. supervision, it operates under the same regulations as supplemented or amended by the RACES regulations (sub-part F).

Now RACES is sponsored by civil defense, a government agency which operates at a number of levels. At federal level, processing of license applications and other paper work is decentralized to eight federal "regions" where an OCD official validates the applications received from states in the region and passes license applications along to an FCC liaison officer in Washington. All federal-level correspondence and administration is conducted from these regional centers.

At state level, the degree of c.d. organization varies. Some states have active c.d. and RACES programs, some scarcely any at all. Generally speaking, the status of RACES in any state is determined by that state's c.d.-consciousness as indicated by the state government's efforts to assure the safety and welfare of the population in the event of the ultimate catastrophe. Usually, any apathy at state level is a reflection of the same thing at local level.

Nevertheless, it is at the local level where most RACES operation takes place. The RO, in coordination with the c.d. communications officer, who is his boss in most organizations, calls a drill or test exercise of one kind or another. The RACES crew turns out, complete with community-owned equipment purchased with taxes (and some personal gear, too). A typical RACES exercise would be controlled from the c.d. control center, usually located in a public building, using the call letters of

a single authorized amateur (often the RO himself). Under such a single authorization, all stations would use unit numbers of this station or preassigned tactical calls for identification, instead of calls of the operators, if any. The group would go through its paces, then secure. There would be no casual "hamming". Once the RACES drill is secured, non-amateur operators (if any) would no longer be permitted to push the "transmit" button. Station units operated by amateur licensees would revert to regular amateur status and use the call of the operator. Only in duly-authorized (by c.d. authority) RACES operation are RACES procedures as permitted by the regulations used. At any other time, the operation is strictly in accordance with the first five sub-parts of the regulations, and any operator not having amateur status is not authorized to operate, *period.*

Natural Emergencies

The RACES regulations (97.161(a)) restrict operation to civil defense communications purposes *only*. In some places, this has been interpreted to mean that RACES cannot be used for natural disaster communications. However, the definition of the term "civil defense communications" makes specific mention of "safety of life, preservation of property, maintenance of law and order, alleviation of human suffering and need", as well as (not necessarily in connection with) results of enemy attack and "any disaster or other incident endangering the public welfare." So it appears obvious that RACES is authorized to operate during any natural disaster *as* RACES, and in fact most RACES organizations have done so to very good effect.

Money and Control

Since RACES is controlled by civil defense, an agency of government at various levels, it usually has the advantage of funds for purchase of equipment, facilities and maintenance services. Such funds are usually provided from a local (town, city or county) budget to a greater or lesser extent, depending on the local status of civil defense. In addition, the federal government makes funds available on a "matching" basis under the Federal Contributions Program.

Briefly stated, "matching funds" are available through state c.d. for purchase of certain type-approved equipments, facilities meeting certain specifications, and certain maintenance and replacement services. The Contributions Program is fully outlined in a manual many times the size of this one.

The RACES part of any local budget is often a sizable part of the total for c.d. purposes, and if properly arranged through channels can defray much of the cost to local amateurs of getting RACES set up.

Most of us amateurs are willing to use our own gear (some indeed prefer it), fewer of us are willing to buy gear specifically for the purpose, and fewer still are willing to install it permanently in public places. The average amateur is apt to say, justifiably, "OK, if you want the equipment installed in a public place, appropriate the money and buy it." When local c.d. does just this (with the help of federally-appropriated funds), it naturally wants to dictate when, where and how this equipment is to be used and who uses it. Some amateurs object to this, with the attitude that "if they want my help, they have to do it my way." But we can't have our cake and eat it too, as the saying goes. If local government buys the equipment, they are going to have plenty to say about its use – much more so than if we amateurs supply the equipment as well as the operators and the basic organization from which to build.

Status of RACES in ARPSC

In 1966, the ARRL Board of Directors passed a motion that the Amateur Radio Public Service Corps consist of AREC, NTS and RACES. This action was widely misunderstood in both government and amateur circles. The former tended to look at it as a "grab" on the part of ARRL to take over an organization competing with its own sponsored groups. Some of the latter looked at it as an abdication of the League's responsibility to render public service through its own organizations.

The Board's action was primarily recognition of the status of RACES as an amateur organization operating in the public interest. If you will take a look at the organizational table on page 4, you will note that ARRL sponsors only AREC and NTS, while RACES is included with other amateur services as an indefinite "third division" of ARPSC.

Civil Defense Organization

As mentioned above, implementation of RACES is performed by various agencies of government, whether federal, state or local. Administration is accomplished primarily through eight federal regional centers located at (1) Maynard, Mass.; (2) Olney, Md.; (3) Thomasville, Ga.; (4) Battle Creek, Mich.; (5) Denton, Texas; (6) Denver, Colo.; (7) Santa Rosa, Colo.; (8) Bothell, Wash. Most c.d. matters are decentralized to these various centers. Each OCD region has a director who gets communications support from U.S. Army Strategic Communications ("Stratcomm"), a communications facility at each regional center staffed by a chief and operation-maintenance people.

OCD exercises jurisdiction over certain phases of license application and over use of federal funds for c.d. (including RACES) equipment, facilities and maintenance, and *advises* on certain RACES operating phases, but has no regulatory control of the latter. The states set up their own RACES operations, within FCC regulations. This is usually done in accordance with recommendations passed down from federal level, particularly where frequency allocations are concerned.

The line of authority from state to local level is much stronger, although this can vary from state to state. Local RACES plans must be approved at state level before they can be passed upstairs to OCD and FCC. Local applications for "matching funds" must show that they are in accordance with overall state plans before they are approved and payment authorized. In some states, all RACES units are licensed to a single station authorization and complete control exercised from state level. In others, licensing is localized and operational rules flow from both local and state authority, depending on the scope of the operation.

APPENDIX *I – NTS NET PROCEDURES*

The following procedures are recommended as an NTS standard and should be aimed at by NTS nets. Deviations from it are made at the discretion of the net manager in cognizance of either necessity or desirability arising out of extraordinary circumstances, but always as a temporary expedient until standard procedure can be resumed.

(a) *General.* The following procedures apply to *all* NTS nets:

(1) NCS transmits a CQ plus the net designation promptly at the net meeting time.

(2) Stations reporting in indicate their function or the destination(s) for which they can take traffic, followed by the list of traffic on their hook, if any.

(3) Time-consuming pleasantries and other superfluous matter are not to be a part of the procedure while the net is in session.

(4) Net stations follow the directions of the net control station without question or comment if such directions are understood.

(5) Lengthy explanations of any kind are not transmitted unless they are absolutely essential to the net's business.

(6) Stations reporting into a net are held for 15 minutes, after which they are excused if there is no further business for them at that time. Others are excused (QNX) as soon as there is no further business for them or, unless in emergency, at the regular net closing time. Stations in the net do not leave net without being excused and do not *ask* to be excused unless absolutely necessary.

(7) All nets follow the general precepts of net operation outlined in the ARRL booklet "Operating an Amateur Radio Station."

(b) *Section Nets.* Two methods of control are available: "roll call" and random call-up. In the former, stations respond to roll call in prearranged order (QNA). This can be alphabetically, by local coverage areas, in order of past reliability, or any other criterion used by the net manager. Sometimes the roll can be called by groups instead of individuals, most profitably used in the large net with many stations. The biggest problem is getting stations logged into the net in as quick time as possible; therefore, whatever method of roll call is used, stations not responding immediately should be passed by. At the end of the roll call, any stations arriving too late to respond to their calls, or stations not on the roll, should be invited to report in. Many net managers have successfully used various devices to expedite the calling of the roll.

When there are only a few stations ordinarily in the net, roll call is not normally used, but stations report in at random after the control station's call-up.

In either method, if QNY (side) frequencies are available, the clearing of traffic should commence as soon as stations reported in the net have traffic for each other, rather than wait until all stations have reported in.

The following additional procedures are used in Section nets:

(1) Stations reporting in indicate their city or QSP coverage (commonly-used abbreviations can be used) *within the section* unless they are designated to receive "thru" traffic, in which case they so indicate. This is followed by a listing of their traffic *by city* (or other pre-arranged designation) if within the Section, or by the designation "thru" if outside the Section. *Example:* C.W. – W9NET reports into his Illinois Section Net; W9NCS DE W9NET QNI SPLD (Springfield) QTC CHGO 1 (Chicago) RI 1 (Rock Island), ESL 1 (East St. Louis) THRU 2 AR. The THRU messages are those destined for any points outside the section. Phone – "W9NCS, from W9NET for Springfield. For Chicago, one; for Rock Island, one; for East St. Louis, one; through, two; over."

(2) The Region net representative is selected beforehand by the net manager, but nevertheless indicates his purpose in reporting in. If, in the above example, W9NET is also the 9RN representative, he simply adds "THRU" or "9RN" after his QNI and deletes his designation of "THRU 2," since these would be held for the Region net.

(3) Stations reporting who do not wish to receive traffic simply indicate the traffic they have to send. Ordinarily, these are stations from outside the Section, since stations within the Section should be willing to receive traffic for their locality.

(4) If a particular city for which there is traffic is not represented on the net, the NCS may inquire who will handle such traffic (QNW), direct that it be sent to the station nearest the destination, or that it be mailed. In any case, there should be a minimum of discussion, particularly if traffic is heavy.

(c) *Region Nets.*

(1) Stations reporting in indicate the *Section* they come from if they are officially reporting for the purpose of handling traffic to or from that

Section. If their function is limited to sending or receiving, they should so indicate; otherwise NCS will assume station will do both. For example, W9NET reports into his Region Net from Illinois: W9NCS DE W9NET QNI ILL . . . etc.

(2) Traffic for destinations in the Region are reported *by Section.* If for destinations outside the Region, by the designation THRU. Continuing the above example: " . . . QTC WIS 3 IND 1 KY 2 THRU 3 AR."

(3) The Area net liaison station (designated beforehand by the Region net manager) receives all traffic designated "THRU" to take to the Area net. He reports into the Region net thus: "W9NCS DE W9CAN QNI CAN QTC (or QRU) . . .etc."

(4) Stations reporting in who are not authorized Section representatives simply indicate the traffic they have to send. If they do not have any traffic, they are given immediate QNX by the net control station *unless* they can provide an outlet not available on the net through regular NTS channels.

(5) In the event a particular Section is not represented in the Region net, the NCS will use a special liaison method (see p. 16) or any alternative channel available for clearing traffic to that Section.

(d) *Area Nets.*

(1) Stations reporting in indicate traffic *by Region* if it is destined for a Region within that Area, *by Area* if destined to a point outside that Area. All stations reporting in indicate for which Region in the Area or for which other Area they are authorized to receive traffic. *Example:* W9NET reports into the Central Area Net (CAN) as an authorized representative of the Ninth Region Net (9RN): W9NCS DE W9NET QNI 9RN QTC RN5 1 TEN 2 EAN 3 PAN 4 AR. He has one message for the Fifth Region, two for the Tenth Region, three for the Eastern Area and four for the Pacific Area. He himself represents the Ninth Region and will take traffic for that Region.

(2) The TCC representative designated to take traffic for another Area so indicates in his QNI thus: "W9NCS DE W5TCC QNI TCC EAN QRU AR." This tells the NCS that W5TCC will take any traffic for the Eastern Area and that he himself has no traffic.

(e) *Phone Nets.* In the event any of the above Region or Area nets are operating on phone, the same general procedure will apply, except that abbreviations and Q signals need not be used.

(f) *Miscellaneous.*

(1) When QNY procedure is used, the station designated to *receive* the traffic should call first, after zeroing on a spot near the QNY point comparatively free of QRM. When a two-way exchange is to be made, the NCS indicates which station calls first.

(2) In QNY procedure, the frequency designated by the NCS is not intended to be exact. NTS stations using this procedure will be careful not to disrupt other traffic nets by carelessly plopping down and starting to call on the net frequency. Also, if QRM is heavy on the spot designated by the NCS, it is expected stations will attempt to find a spot nearby on which to clear their traffic rather than returning to net frequency without having cleared it.

(3) It is not the policy for NTS nets to insist on a clear channel. Other stations operating on the frequency of an NTS net have a perfect right to be there. Net control stations should not call such stations requesting them to move. If the net frequency is occupied at net starting time, NCS should call the net on a nearby clear channel if possible.

(4) More than one liaison station may be provided if traffic load is heavy and if personnel available is sufficient. The net manager would decide the function of each station. Ordinarily, one station is given traffic to transmit and another is instructed to receive traffic; however, it is perfectly permissible, and may have some advantages to the NCS of the net being liaisoned with, for traffic both going and coming to be divided among the two or more liaison stations.

(g) The above procedure is not mandatory but is exemplary of what we are trying to accomplish in NTS. All net managers are urged to abide by it as closely as possible so that NTS procedure will be nearly standard throughout the nation.

II – ARRL PRECEDENCES AND HANDLING INSTRUCTIONS

All messages handled by amateur radio should contain precedences – that is, an evaluation of each message's importance, made by the originating station. There are three precedences – Emergency, Priority and Routine, defined as follows:

EMERGENCY – Any message having life and death urgency to any person or group of persons, which is transmitted by amateur radio in the absence of regular commercial facilities. This includes official messages of welfare agencies during emergencies requesting supplies, materials or instructions vital to relief of stricken populace in emergency areas. During normal times, it will be *very rare.* On c.w., this designation will *always* be spelled out. When in doubt, *do not* use it.

PRIORITY – Important messages having a specific time limit. Official messages not covered in the "Emergency" category. Press dispatches and other emergency-related traffic not of the utmost urgency. Notification of death or injury in a disaster area, personal or official. Use abbreviation P on c.w. Inquiries as to the health or welfare of someone in the disaster area are handled after the above are cleared and are designated "priority two." (P2) or Q.

ROUTINE – Most traffic in normal times will bear this designation. In disaster situation, traffic labeled "Routine" (R on c.w.) should be handled *last*, or not at all when circuits are busy with emergency or priority traffic. Most traffic handled

on amateur circuits in normal times will fall in this category.

The precedence will follow, but is not a part of, the message number. For example, a message may begin with NR 207 R on c.w., "Number Two Zero Seven, Routine" on phone.

Handling instructions (HX) are a less-used but quite useful tool in handling messages. They are for the purpose of conveying any special instructions to handling and delivering operators. This prosign, when used, is inserted in the message preamble between the precedence and the station of origin. Its use is *optional* with the originating stations, but once inserted is *mandatory* with all relaying stations. The following definitions apply:

HXA – (Followed by number.) Collect landline delivery authorized by addressee within . . miles. (If no number, authorization is unlimited.)

HXB – (Followed by number.) Cancel message if not delivered within . . . hours of filing time; service originating station.

HXC – Reporting date and time of delivery (TOD) to originating station.

HXD – Report to originating station the identity of station from which received, plus date and time. Report identity of station to which relayed, plus date and time, or if delivered report date, time and method of delivery.

HXE – Delivering station get reply from addressee, originate message back.

HXF – (Followed by number.) Hold delivery until . . . (date).

Example: NR 207 R HXA50 W4MLE CK 12 . . .(etc.).

If more than one HX prosign is used, they can be combined if no numbers are to be inserted, otherwise the HX should be repeated thus: NR 207 R HXAC W4MLE . . .(etc.), but: NR 207 R HXA50 HXC W4MLE . . .(etc.). One phone, use phonetics for the letter or letters following the HX, to insure accuracy.

III – OPERATION OF THE TRANSCONTINENTAL CORPS

The purpose of the Transcontinental Corps (TCC) is to relay traffic from one NTS Area to another, conducting liaison with NTS Area nets to do so. Administratively, the TCC is divided into three parts following the coverage of the three Area nets: Eastern, Central and Pacific. Each Area has a TCC Director who assigns functions, centralizes activity and reports status each month to ARRL headquarters on a form provided for that purpuse.

TCC functions are performed in several ways, according to circumstances. In the case of traffic going from the Eastern to the Central Area, it is feasible for the TCC station performing this function (TCC Station A) to receive the traffic in EAN between 0130 and 0230 and report it directly into CAN during the next hour. With traffic going in the opposite direction, however, from Central to Eastern Area, a Central Area Station (TCC Station C) receives the traffic in CAN between 0230 and 0330, then keeps a schedule with an Eastern Area station (TCC Station K) to relay this traffic, which the latter then distributes among Eastern Area NTS nets as soon as practicable. In transfers from the Eastern to the Pacific Area and from the Central to the Pacific Area, and vice versa, greater distances are involved and more difficulties are met with; these transfers are made entirely by out-of-net schedules, at times and on frequencies worked out to give the best service possible on an organized, systematic basis. The station-function description below will adequately explain how this is done.

TCC stations must have the following qualifications. (1) Adequate signal power to perform the job to be done; normally, inputs of under 100 watts cannot accomplish it unless a very efficient antenna system is used. (2) The highest calibre of operating ability and NTS net "savvy." (3) Capability both personally and equipment-wise to keep the required schedules.

A TCC station normally performs only one TCC function per week. On other days of the week, other stations will perform the same function. Thus, the station designations below must be keyed because they are not the same station each night of the week. TCC operates on a seven-day-per-week basis. Each function consists of two steps, as follows:

Station Function

A. 1. Normally located in the *Eastern* Area, this station reports into Eastern Area Net (EAN) at 0130, receives all traffic for Central Area (CAN).
2. Reports into Central Area Net (CAN) the same night at 0230, distributes the traffic upon direction of the CAN control station.

B. 1. Normally located in the *Eastern* Area, this station reports into Eastern Area Net (EAN) at 0130, receives all traffic for the Pacific Area (PAN).
2. Keeps a schedule with *Station H* some time between 0230 and 0430 and sends this traffic to him.

C. 1. Normally located in the *Central* Area, reports into Central Area Net (CAN) at 0230, takes all traffic for the Eastern Area (EAN).
2. Keeps a schedule with *Station K* some time after 0330 and sends this traffic to him.

D. 1. Normally located in the *Eastern* Area, this station keeps a schedule with *Station J* some time between 0530 and 2400 to receive traffic for the Eastern Area.

2. Sends this traffic into destination Section, Region or the Eastern Area Net (EAN) at first opportunity.

E. 1. Normally located in the *Central Area,* this station reports into Central Area Net (CAN) at 0230, receives all traffic for Pacific Area (PAN).

2. Keeps a schedule with *Station G* between 0330 and 0430 and sends this traffic to him.

F. 1. Normally located in *Central Area,* this station keeps a schedule with *Station I* between 0530 and 0100 to receive for the Central Area.

2. Sends this traffic into destination Section, Region or the Central Area Net as soon as possible after received.

G. 1. Normally located in *Pacific Area.,* this station keeps a schedule with *Station E* between 0330 and 0430 to receive traffic for the Pacific Area (PAN).

2. Reports into the Pacific Area Net (PAN) at 0430 to distribute this traffic under direction of the PAN control station.

H. 1. Normally located in *Pacific Area,* this station keeps a schedule with *Station B* between 0230 and 0430 to receive traffic for Pacific Area (PAN).

2. Reports into the Pacific Area Net at 0430 the same night to distribute this traffic under direction of the PAN control station.

I. 1. Normally located in *Pacific Area,* this station reports into the Pacific Area Net (PAN) at 0430 to receive traffic for the Central Area (CAN).

2. Keeps a schedule with *Station F* between 0530 and 0100 the following day to send this traffic.

J. 1. Normally located in *Pacific Area,* this station reports into the Pacific Area Net (PAN) at 0430 to receive for the Eastern Area (EAN).

2. Keeps a schedule with *Station D* between 0530 and 2400 to send this traffic.

K. 1. Normally located in *Eastern Area,* this station keeps a schedule with *Station C* between 0330 and 2400 to receive traffic for Eastern Area (EAN).

2. Sends this traffic into destination Section, Region or the Eastern Area Net as soon as possible after received.

IV – NTS TRAFFIC ROUTING

The following are some general examples to show how traffic is or can be routed on the National Traffic System.

(a) This example demonstrates how a message originating in South Carolina finds its way to Los Angeles, and how the answer is transmitted back: W4ABC is an amateur in South Carolina who has a message to originate in Los Angeles. The message goes through the following steps (all times GMT, of course):

(1) W4ABC reports into the South Carolina Section Net at 0000 with the message and transmits it, to W4DEF, the station designated to report to 4RN.

(2) W4DEF takes the message to 4RN at 0045, sends it to W4GHI, the station designated to report to EAN.

(3) W4GHI takes the message to EAN at 0130, sends it to W3ABC, the TCC station who reports in for PAN traffic (TCC Station B).

(4) W3ABC keeps a TCC out-of-net schedule with W6ABC (TCC Station H) and sends him the message. This schedule can be completed any time before 0430 and on whatever frequency is necessary to get best reception at that distance; usually a frequency in the 7 or 14 Mc. band will be required, depending on the season and propagation conditions.

(5) W6ABC reports into the Pacific Area Net at 0430 and gives the message to W6DEF, the RN6 representative.

(6) W6DEF takes message to the Sixth Region Net at 0530 (or following day, if no 0530 Region session) where he gives it to W6GHI, the Los Angeles Section representative.

(7) W6GHI takes it to the Los Angeles Section Net meeting at 0600 (or following day, if no 0600 Section session), where he gives it to W6JKL, who is in LA not far from the message's destination.

(8) W6JKL telephones the message to its addressee, gets a reply which he reports into the Section Net at 0300 following day, and gives it to W6MNO who is scheduled to represent the LA section in the Sixth Region Net at 0345.

(9) W6MNO takes the message to RN6 at 0345, where he gives it to W6PQR, the representative to PAN.

(10) W6PQR takes the message to PAN at 0430, where he gives it to W7ABC, the TCC station designated to take traffic for EAN (TCC Station J).

(11) W7ABC sends the message to W2ABC (TCC Station D) during a regular TCC out-of-net schedule some time after 0530.

(12) W2ABC reports into the South Carolina Net with the message at 0000 the following day, gives the message to W4ABC. The message was delivered within 6 hours of time it was originated; the reply was delivered two days later.

(b) During heavy traffic season or any time when enough personnel is available, it is often desirable to send *two* stations to higher-level nets. This procedure has the added advantage of making the tour of duty of each station shorter. First, let's consider what has to be done by a Section Net representative if only one man is sent up.

(1) He reports into Section Net (I) as Region liaison, is given all traffic going out of section.

(2) He reports into Region Net (I), distributes his traffic, receives any traffic for his section.

(3) He reports into Region Net (II), receives any additional traffic for his Section.

(4) He reports into Section Net (II), to distribute his traffic.

Now consider what is done if two stations are available to attend the Region Net:

(1) In Section Net (I). Station A is given all out-of-Section traffic to take to Region Net (I).

(2) He reports into Region Net (I) with this traffic, receives any traffic for his Section. This he can take to Section Net (II) (if any) or hold until 0000 the next day. Assuming he does the latter, he is through for the evening.

(3) Station B reports into Region Net (II) to pick up any traffic for his Section (same Section as Station A).

(4) Station B then reports into Section Net (II) (if any) to distribute this traffic; or holds it for Section Net (I) the following day.

V – COUNTING NET TRAFFIC

The basic count for traffic handled in nets is one point for each time a message in standard ARRL form is *transmitted and received* during a net session, at the direction of the net control station. This has nothing to do with the individual station traffic count. In a net count there is no breakdown of originated, received, relayed and delivered traffic as there is for individual stations. The count is the number of message *handlings* accomplished during the net's directed sessions.

This is simple enough, yet there seems to be considerable confusion about it. A few examples may be helpful:

Example 1: Upon conclusion of his directed net, a NCS operator finds that there were 23 messages reported into the net and that 20 of these were "cleared" – that is, at his direction transmitted by the station holding them and receipted for by the station receiving them. The "net" traffic count for this net session was therefore 20. It makes no difference to the net count whether the messages were originals with the transmitting station, whether he is relaying them, whether they are addressed to the receiving station, delivered by the latter or relayed by him. All the net is concerned with is *handling* them, from one station to the other. Note that the net does not get credit for traffic reported, only for traffic *cleared.*

Example 2: Net control must base his count on the figures reported to him by net stations. Thus, if a station reporting into the net says he has five messages and later succeeds in clearing them at net control's direction, the net gets credit for handling five messages. However, suppose net control dispatches this station and the station to receive the messages to a side frequency to clear them, then closes the net five minutes later. How does he know whether the traffic was successfully cleared, or *how many* were cleared

Well, he doesn't, unless he checks; if so, he can enter the exact count. Otherwise, knowing the ability of the two operators concerned, he can *estimate* what proportion of the traffic was cleared. It is not considered ethical to QNY large amount of traffic just prior to closing a net and counting all such traffic as having been cleared during QND.

Example 3: "Book" messages should be reported into the net not as books, but in accordance with the count they will earn when handled. Thus, a book of four messages is reported in not as "QTC book of 4," but as "QTC 2," followed by the destination. This assumes that they are all to be sent to the same station. If they are to be sent to different stations, the "book" should be broken down and the resulting separate messages reported in as such rather than as books.

Don't waste valuable net time fussing about the count. The important thing is to get the traffic handled!

NATIONAL TRAFFIC SYSTEM ROUTING GUIDE

State	*Reg.*	*Area*	*State*	*Reg.*	*Area*
Alaska	7	PAN	Nev.	6	PAN
Ala.	5	CAN	N.B.	11	EAN
Alta.	7	PAN	N.H.	1	EAN
Ariz.	12	PAN	N.J.	2	EAN
Ark.	5	CAN	N.M.	12	PAN
B.C.	7	PAN	N.Y.	2	EAN
Calif.	6	PAN	Newf.	11	EAN
C.Z.	4	EAN	N.C.	4	EAN
Colo.	12	PAN	N.Dak.	10	CAN
Conn.	1	EAN	N.S.	11	EAN
Del.	3	EAN	Ohio	8	EAN
D.C.	3	EAN	Okla.	5	CAN
E.Fla.	4	EAN	Ont.	11	EAN
W.Fla.	5	CAN	Ore.	7	PAN
Ga.	4	EAN	Pa.	3	EAN
Guam	6	PAN	P.E.I.	11	EAN
Hawaii	6	PAN	P.R.	4	EAN
Idaho	7	PAN	Que.	11	EAN
Ill.	9	CAN	R.I.	1	EAN
Ind.	9	CAN	Sask.	7	PAN
Iowa	10	CAN	S.C.	4	EAN
Kans.	10	CAN	S.Dak.	10	CAN
Ky.	9	CAN	Tenn.	5	CAN
Labr.	11	EAN	Texas	5	CAN
La.	5	CAN	Utah	12	PAN
Me.	1	EAN	Vt.	1	EAN
Man.	10	CAN	Va.	4	EAN
Md.	3	EAN	Wash.	7	PAN
Mass.	1	EAN	W.Va.	8	EAN
Mich.	8	EAN	Wis.	9	CAN
Minn.	10	CAN	Wyo.	12	PAN
Miss.	5	CAN	V.I.	4	EAN
Mo.	10	CAN	APO-N.Y.	2	EAN
Mont.	7	PAN	APO-SF	6	PAN
Nebr.	10	CAN			